

REMARKS

Status of Claims

Claims 1- 4, 7-13, 15-18, 19-20 are pending.

Claims 5, 6, 12, and 17 are canceled.

New claims 21, 22. No new matter is added.

Priority Claim

Applicant requests that the Office acknowledge the claim of priority under 35 USC Section 119(c). The present application claims priority to PCT Application No. PCT/US2003/027034, filed 8/28/2003, which claims the benefit of U.S. Provisional Application No. 60/412,377, filed 9/20/02.

Information Disclosure Statement

Applicant thanks the Examiner for acknowledging receipt of the Information Disclosure Statement submitted on July 19, 2005.

Drawings

Applicant thanks the Examiner for accepting the Drawing Office submitted on January 12, 2005.

Claims Objections

Claims 16-18 are objected to for informalities. Applicant has amended claim 16 and claim 15 upon which claim 16 depends, curing that objection. The dependency string of claim 18 on claim 17 and hence on claim 16 (and hence on claim 15) being intended, Applicant presumes the objection to claims 17 and 18 to concern the order of presentation with respect to later claims depending on claim 15. Applicant in response has cancelled claims 17 and 18, and added identical new claims 21 and 22, thus curing this objection. No new subject matter is added.

Claim Rejections – 35 USC § 103

Claims 1-6, 8-19:

The Office rejected Claims 1-6, 8-19 under 35 U.S.C. 103(a) as being unpatentable over Bakhle et al. (US 6,061,092) in view of Medina US 5,08 1,530). Applicant has carefully considered the Office rejections and respectfully submits that the amended claims, as supported by the arguments herein, are distinguishable from the cited reference.

According to the MPEP §2143.01, "[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found in either the references themselves or in the knowledge generally available to one of ordinary skill in the art."

It is not enough to merely attribute the elements of the Applicant's claims to the references and summarily conclude the claims to be obvious. "...[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *See Lee*, 277 F.3d at 1343-46; *Rouffett*, 149 F.3d at 1355-59." *In re Kahn* (Fed. Cir. 2006, 04-1616).

The Applicant's disclosure, and the claims as amended, are directed particularly to *thermal* imaging systems and configurations thereof for sensing the thermal emission pattern of an external scene not otherwise illuminated. Thermal imaging systems have unique characteristics and requirements not present in illuminated scenes where *reflected* energy, rather than *thermal emission*, is the basis of the imaging system. Neither Bakhle nor Medina is directed to thermal imaging where the internal radiant flux of the system is orders of magnitude greater than the sensed external scene thermal

radiation. In order to achieve the required sensitivity to detect the very small difference between the external scene radiation and the internal radiant flux, the thermal imaging systems according to the Applicant's invention should correct for the *all* of internal radiant flux inherent in the imaging system, meaning and intending as is explained in the specification that all elements of the system that direct other than external scene thermal radiation to the pixel array need to be captured in the closed state image signal, precisely because they are all present in the open state external scene image signal.

Put another way, the basic difference between the Applicant's process and Bakhle's is that with Bakhle's CMOS devices, which work in the visible part of the spectrum, the Dark Fixed Pattern Noise (DFPN) is inherent to the detector array, whereas for arrays operating in the LWIR range, particularly un-cooled arrays, the non-uniformity is a consequence of emission from the imaging sensor system as well as from non-uniformities inherent to the detector array. Since emissions from the sensor system fall non-uniformly on individual detectors, they are a source of non-uniform detector response. Placing the shutter in front of the lens enables a more complete correction of the final image. Otherwise, the correction process is only partially executed, correcting the detector array DFPN, but not the sensor system emission induced DFPN.

Referring to Applicant's paragraphs [0016], [0024], [0025], Figure 1, and paragraphs [0027],[0028] and elsewhere in the specification, the details and advantages of the front of lens shutter configuration are further explained. The convention of thermal imaging systems at the time of the invention was to place the shutter adjacent to the FPA, for several practical reasons. Systems were commonly cryogenically cooled. The lens was confined within the cooling envelope. There was room between the lens and the FPA for the shutter, and placement there kept the shutter relatively small. The conventional packing configuration made sense at the time. Applicant further provides among the claims for correcting for offset using external scene and closed shutter states where the internal flux is always present, and for correcting pixel-to-pixel non-uniformities, which for example might include correcting pixel gain using different

reference level scene signals. Applicant is not aware of any thermal imaging system technology of the day that recognized or embraced the idea of putting the shutter outboard of the lens and correcting image signals in the manner claimed, for the advantages described.

Regarding claims 1, 10, 15 and 16, all as amended, Bakke is acknowledged to fail to disclose the claimed shutter/lens/FPA configuration, but Bakke is also clearly less relevant by its devotion to reflected light collection imaging rather than thermal imaging, where reflected scene illumination is relatively intense, any internal radiant flux or heat present in the system is not a major consideration, correcting the image signal is limited to discussion of offset, and the dark image subtraction data needs only to reflect electronic conditions within the array itself rather than across the full range of internal system emissions or flux to which the FPA is exposed. Bakke is conventional in its configuration, is not directed to the same technology, and is contrary to claim 1 in that *it teaches* by implication that the shutter is *best placed* between the lens and the FPA. In light of the amendments and these remarks, Applicant requests the rejection be withdrawn.

Medina discloses a video-imaging camera system, again not directed to the unique characteristics of thermal emissions-based imagery and systems. It is of little consequence performance-wise to place the shutter in a visible light system anywhere within a system where isolation and light control is easily managed and the scene is well illuminated so that external image intensity is extremely high compared to internal system conditions. Other more basic criteria such as simple packaging design, component sizing and cost of manufacturing dominate the decision process. Applicant asserts that those skilled in the thermal imaging arts in view of Bakke, and also Sato, Thomas and Yoshida, would not be persuaded by Medina to adopt its front of lens shutter configuration for its claimed thermal imaging methods and systems, and could not, without inventive effort. In light of amendments and these remarks, Applicant requests the rejection be withdrawn.

Regarding claims 2-4, 6-9, and 19, and new claims 21, 22 replacing cancelled claims 17 and 18, Applicant incorporates its above remarks and asserts these claims to be allowable at least by reason of being dependent on an allowable base claim, and respectfully quests reconsideration. Claim 5 is cancelled.

Regarding claims 11-13 as amended, Applicant incorporates its above remarks and asserts these claims to be allowable at least by reason of being dependent on an allowable base claim, and respectfully requests reconsideration. Claim 14 is cancelled.

Claims 17 and 18 are cancelled and replaced with new claims 21 and 22 as noted above. No new subject matter is added.

Claims 7, 20:

Office rejected claims 7 and 20 under 35 USC 103(a) as being unpatentable over Bakhle in view of Medina further in view of Sato's US6,181,484. Applicant respectfully traverses as follows.

Office attributes to Sato a shutter located within 1.97mm of the imaging-side surface of the lens L2 as disclosed at col. 4, lines 48-51, as the further basis for the rejection. Applicant incorporates its above comments and respectfully points out that the Examiner has misinterpreted the reference. Sato's shutter 2 is located *between* lens L2 and lens L3 of lens group G1, which together with lens group G2 comprises the Sato system lens, as a simple reading of the reference will indicate. Applicant's use of the term "lens" in claims 7 and 20 are intended to refer to the entire lens assembly or lens set, with its shutter being outboard of the complete lens set so that the full influence of the complete lens set is included in the closed state image signal.

To be consistence with claims 7 and 20, Sato's shutter 2 would need to be located on the image side of his outboard lens L7, within the distance specified, which would be outboard of the full lens assembly, and totally contrary to what Sato is teaching.

Based on these remarks it cannot be credibly said that Sato in any way, in any combination with Bakke, Medina, Thomas, or Yoshida, suggests both the configuration and dimension of claims 7 and 20, particularly in light of the context and limitations of the base claims upon which they depend, and therefore Applicant respectfully requests the rejection be withdrawn. In addition and/or in the alternative, Applicant asserts claims 7 and 20 to be allowable at least by reason of being dependent on respective allowable base claims, and therefore requests reconsideration.

Prior Art Made of Record:

Applicant acknowledges the Thomas and Yoshida references cited by the Office as pertinent. Thomas discloses a photodiode array but does not inform as to lens and shutter configurations. Yoshida discloses a shutter inboard of its lens, as at Fig. 1, col.4, line 25+.

Telephone Interview

Present Office policy places great emphasis on telephone interviews initiated by the examiner. For this reason, it is not necessary for an attorney to request a telephone interview. Examiners are not required to note or acknowledge requests for telephone calls or state reasons why such proposed telephone interviews would not be considered effective to advance prosecution. However, it is desirable for an attorney to call the examiner if the attorney feels the call will be beneficial to advance prosecution of the application. MPEP§408

Applicant believes the above amendments and remarks to be fully responsive to the Office Action, thereby placing this application in condition for allowance. No new matter is added. Applicant requests speedy reconsideration, and further requests that Examiner contact its attorney by telephone, facsimile, or email for quickest resolution, if there are any remaining issues.

Respectfully submitted,
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